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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/812,653

03/29/2004

Charles M. Lieber

H0498.70112US01

3416

7590

10/13/2006

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EXAMINER

WEISS, HOWARD

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 10/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/812,653	LIEBER ET AL.	
	Examiner	Art Unit	
	Howard Weiss	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 10 August 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3,5,7-10,13,14,16-18,20-23,56-59,90-104,107-112 and 114-117 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,5,7-10,13,14,16-18,20-23,56-59,90-104,107-112 and 114-117 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                        |                                                                   |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8/10/06</u>                                                   | 6) <input type="checkbox"/> Other: _____                          |

Attorney's Docket Number: H0498.70112US01

Filing Date: 3/29/04

Continuing Data: Continuation of 10/033,369 (10/24/01 now U.S. Patent No. 6,781,166)  
which is a Continuation of PCT/US00/18138 (6/30/00) and claims  
benefit of 60/142,216 (7/2/99); RCE established 12/23/05

Claimed Foreign Priority Date: none

Applicant(s): Lieber et al. (Rueckes, Joselevich, Kim)

Examiner: Howard Weiss

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Initially, and with respect to Claims 56, 57 and 114 to 117, note that a "product by process" claim is directed to the product per se, no matter how actually made. See *In re Thorpe et al.*, 227 USPQ 964 (CAFC, 1985) and the related case law cited therein which make it clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not

patentable as a product, whether claimed in "product by process" claims or not. As stated in Thorpe,

even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972); *In re Pilkington*, 411 F.2d 1345, 1348, 162 USPQ 145, 147 (CCPA 1969); *Buono v. Yankee Maid Dress Corp.*, 77 F.2d 274, 279, 26 USPQ 57, 61 (2d. Cir. 1935).

Note that Applicant has burden of proof in such cases as the above case law makes clear.

3. Claims 1, 3, 5, 7 to 10, 13, 14, 16 to 18, 20 to 23, 56 to 59, 90 to 104 and 107 to 112 and 114 to 117 are rejected under 35 U.S.C. 103(a) as being unpatentable over Melzner et al. (U.S. Patent No. 5,774,414) and Brandes et al. (U.S. Patent No. 6,445,006).

Melzner et al. show most aspects of the instant invention (e.g. Figures 2 and 3) including an electrical crossbar array comprising two crossed conductors **3,11** defining memory elements switchable between two readable states **U,O**, free of auxiliary circuitry and one of the wires movable from a first position to a second position.

Melzner et al. do not show the conductors in electrical or Van der Waals contact and to be nanoscopic being made of single or multiwall carbon nanotubes and auxiliary circuitry including transistors, capacitors and contact electrodes. Brandes et al. teach (e.g. Figure 9 and Column 2 Lines 31 to 40) to have auxiliary circuitry **1015** including transistors, capacitors (Column 10 Lines 6 to 11) and contact electrodes wires **678, 679** in electrical or Van der Waals contact and made of single or multiwall carbon nanotubes to capitalize on the semiconducting properties of carbon nanotubes (Column 8 lines 1 and 2). It would have been obvious to a person of ordinary skill in the art at the time of invention to have wires in electrical or Van der Waals contact

and made of nanoscopic single or multiwall carbon nanotubes and auxiliary circuitry including transistors, capacitors and contact electrodes as taught by Brandes et al. in the device of Melzner et al. to capitalize on the semiconducting properties of carbon nanotubes.

As to the grounds of rejection under section "product by process", how the conductors are produced, either by forming and transporting on to a surface or by some other means, pertains to intermediate process steps which do not affect the final device structure. See MPEP § 2113 which discusses the handling of "product by process" claims.

#### ***Response to Arguments***

Applicant's arguments filed 12/23/05 have been fully considered but they are not persuasive. The Examiner's response to the Applicants' arguments in the last office action mailed 2/21/2006 is still relevant and is considered repeated herein. In reference to the expectation of success, Brandes et al. clearly state (Column 8 Lines 62 to Column 9 Line1):

"The unique mechanical and electrical properties of carbon nanotubes enable a variety of novel electromechanical devices to be produced, when a suitable method of incorporating the carbon nanotube (microfiber) into the device is employed. The catalyst patterning and carbon nanotube growth process of U.S. Pat. No. 5,872,422 provides a useful approach for accomplishing this result."

Therefore, Brandes et al. give at least one approach to one of ordinary skill in the art for successfully incorporating carbon nanotubes into MEMS devices. In view of these reasons and those set forth in the present office action, the rejections of the stated claims stand.

#### ***Conclusion***

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

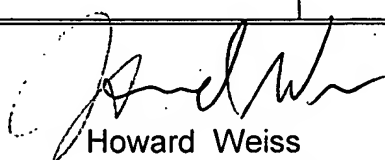
5. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866-217-9197** (toll-free).
6. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(571) 273-8300**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.
7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Howard Weiss at **(571) 272-1720** and between the hours of 7:00 AM to 3:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via [Howard.Weiss@uspto.gov](mailto:Howard.Weiss@uspto.gov). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on **(571) 272-1705**.

Art Unit: 2814

8. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/211; 365/151; 977/ 932	Thru 10/6/06
Other Documentation: none	
Electronic Database(s): EAST	Thru 10/6/06

HW/hw  
10 October 2006



Howard Weiss  
Primary Examiner  
Art Unit 2814